



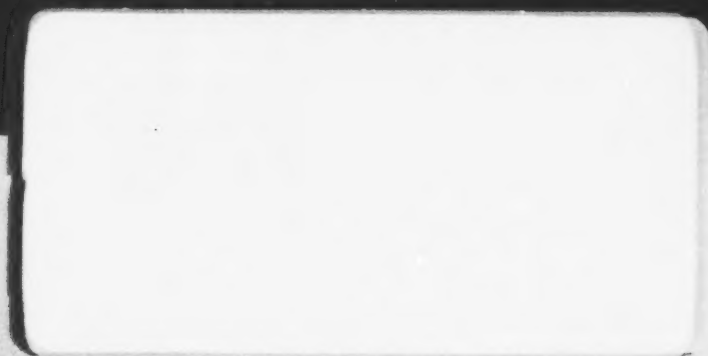
Transport
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TP 1624

**Marine Casualty
Investigations**

**Enquêtes sur les
accidents maritimes**



**Investigation
Report
to the Minister
pursuant
to sections
542 or 545
of the
Canada
Shipping Act**

**Rapport
d'investigation
au Ministre
conformément
aux articles 542
ou 545 de la Loi
sur la marine
marchande
du Canada**

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Ce rapport est aussi disponible en français.

INVESTIGATION REPORT INTO THE
CIRCUMSTANCES ATTENDING THE FIRE
ON BOARD THE CANADIAN M.V.
"ALGOSOO" WHILE SECURED ALONGSIDE,
IN THE WELLAND CANAL, PORT
COLBORNE, ONTARIO, ON MARCH 7, 1986.

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REPORT No. 442

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INVESTIGATION REPORT INTO THE CIRCUMSTANCES ATTENDING THE FIRE
ON BOARD THE CANADIAN M.V. "ALGOSOO" WHILE SECURED ALONGSIDE, IN
THE WELLAND CANAL, PORT COLBORNE, ONTARIO, ON MARCH 7, 1986.

Particulars of Vessel

Name	"ALGOSOO"
Port of Registry	Sault Ste. Marie, Ontario
Official Number	346839
Call Sign	VGJD
Length O.A.	222.51 m (730')
Breadth Extreme	22.99 m (75.4')
Depth Moulded	13.57 m (44.5')
Gross Tonnage	21,716
Registered Tonnage	16,093
Built	1974, Collingwood, Ontario (of steel)
Type	Bulk Carrier Great Lakes Self Unloader
Propulsion	2 Crossley Pielstick Diesel Engines 9000 b.h.p. Geared to single shaft controllable pitch propeller
Owner	Algoma Central Railway Box 7000, Sault Ste. Marie Ontario, P6A 5P6
Ship Repairers	Herb Fraser and Associates Limited, 1 Chestnut Street, Port Colborne, Ontario
Classification Society	Lloyd's Register of Shipping
Crew	1 Shipkeeper
Certification	As the vessel was under repair, no certificates had been issued
Cargo	None

Draught

F: 0.91 m (3' 00")
A: 3.20 m (10' 06")

Description of Vessel

The bridge is located forward and the engine-room and the boom conveyor belt tower are aft. There is accommodation for the crew in both the forward and after superstructures. The boat deck, located aft, houses fans for air conditioning and ventilation.

- NOTE:** 1. All times in this report are expressed in Eastern Standard Time, (UTC minus 5 hours).
2. A glossary of abbreviations and terms can be found following the Findings in this report.

Background

The "ALGOSOO" was under repair during the winter lay-up in the Welland Canal entrance at Port Colborne. 'Hot work' repairs were in progress in the cargo self-unloading lower loop belt casing and transfer belt areas.

During the lunch break, fire was discovered in the loop belt casing and the Port Colborne Fire Department was called. They had problems fighting the fire due to heat and flames, difficulty of access and locked accommodation doors. Flooding the engine-room with foam saved most of the machinery, but severe damage was sustained in the self-unloading machinery and after accommodation. Repairs have been estimated to be in the range of 9 to 10 million dollars.

This is the second major fire in 18 months in the conveyor belt system of a Canadian self-unloading vessel.

Narrative

The "ALGOSOO" was berthed port side to the west side tie-up wall just above Lock 8, Welland Canal, Port Colborne for her winter lay-up. Some of the engine-room staff stayed aboard to work in January, but in February, repairs were being carried out only by the ship repairers and their subcontractors.

The owners had a shipkeeper on board night and day. He was allocated a room on the port side of the spar deck aft, abaft the crew's recreation room. There was a telephone connection to the

shore and a list of persons for him to call in case of problems.

On the morning of Friday, March 7, 'hot work' repairs were in progress, as follows:

Loop belt elevator casing lower section incline ladder, port side - replacing short length of vertical 51 mm (2") i.d. water pipe - electric arc welding.

Loop belt elevator casing lower section incline ladder, starboard side - removing fabrication stands of 1" boiler tube from sloping bulkhead with oxy-acetylene cutting torch.

Above the transfer conveyor belts port and starboard and the amidships hold conveyor belt - removing 51 mm (2") i.d. hydraulic pipes with oxy-acetylene cutting torch.

Hold conveyor belt tunnel, port side, beneath No. 4 hold - repairs to hydraulic lines - electric arc welding.

Diesel oil bunker tank, starboard, at ship's side - 2 electric arc welders working.

Boom tower above loop belt - 'hot work' on door at top front completed early in the day.

In addition to this 'hot work', the holds and hatch covers were being sand blasted and painted and the conveyor belt repaired. Work ceased at noon, and the workmen from the loop belt casing areas went to have lunch in the crew's recreation room.

At about 1220, a supervisor returning from shore entered the port side door of the after house and observed thick black smoke coming from the door of the loop belt casing.

The supervisor raised the alarm with the help of the men in the crew's recreation room and went ashore to call the Port Colborne Fire Department. One man went down No. 5 hold and informed the men who were having lunch in the port conveyor tunnel about the fire. One of these went aft in the port tunnel and attacked the fire with a portable fire extinguisher, but it was ineffective against the conflagration in the after end. These men escaped by walking forward in the conveyor tunnel.

Two welders having lunch in the engine-room control room heard a 'bang' and saw dust falling; they were informed about the fire and made their way up to the spar deck port side alleyway. Some of the men in the crew's recreation room preferred not to pass through the smoke in the port alleyway and escaped through a sidelight onto the afterdeck. Oxy-acetylene bottles were moved

away from the after house.

The Port Colborne Fire Department brought a pumper, a rescue truck and an aerial ladder vehicle, but due to the thick ice on the canal and the long distances to fire hydrants, tanker trucks had to be requested until a hole could be cut for the hose suction.

They attacked the fire with hoses which were led through the door of the loop belt casing from the port side spar deck alleyway.

This was ineffective in the confined space and in the face of the intense heat and smoke.

A hose with a remote control nozzle on an aerial ladder poured water through a doorway in the conveyor boom tower on the port side of the boat deck.

The owners, concerned about the fire spreading to the engine-room, requested that foam be applied there. This was achieved through the port side shell door. A heavy explosion was felt in the area of the engine-room while this door was being opened.

The fire spread into the accommodation and firemen had problems with the outside entrance, cabin and store-room doors which were locked for security reasons. At 1950, the fire appeared to be under control, but there were several outbreaks in the accommodation. The firemen remained on board working until 0543 on March 8.

Analysis

1. Damage

As a result of this fire, the "ALGOSOO" suffered severe damage in the:

- loop belt elevator system and casing;
- boom tower and conveyor;
- transfer conveyor belt system;
- after ends of the three hold conveyors;
- engineers' and electricians' stores on engine-room machinery deck;

- engine control room and electrical systems on the port side of the engine-room main deck;
- crew accommodation on spar and poop decks aft; and
- boat deck air conditioning machinery.

Heat distortion caused a small crack in the port bunker tank which was full of diesel oil.

There were no deaths or injuries.

There was no damage to a third party although classes at the De Witt Carter School on the east side of the canal were disrupted by heavy black smoke, and work was interrupted at a moving and storage establishment situated downwind.

There was no pollution; the residue from the liquids used in fire fighting, about 370,000 L (80,000 gallons), was removed from the damaged vessel by tank trucks.

2. Cause of Fire

a) Possible Sources of Heat

- i) Sparks or molten slag from electric welding near belts at the base of the loop belt casing, port side.
- ii) Sparks or molten metal from oxy-acetylene torch cutting near the belts at the base of the loop belt casing, starboard side.
- iii) Sparks or molten metal from oxy-acetylene torch cutting above the transfer belts and the amidships hold conveyor belt at the bottom of the loop belt casing.

b) Combustible Materials

i) Conveyor belts

These belts are similar in composition and construction to automobile tires and do not readily ignite; however, the belts were reported to be oily in places and tests on belt samples taken from these places showed that they were relatively easy to ignite. Recent cargoes were potash and salt, and potash is treated with oil for dust abatement.

The configuration of four parts of conveyor belts with air spaces between them enhanced the chimney effect within the loop belt casing as soon as the fire caught hold.

ii) Coal

Remnants from previous coal cargoes were found in nooks and crannies difficult to reach in ordinary washdown cleaning.

iii) Garbage

The housekeeping was to an acceptable standard, but pieces of cartons and papers were found in the area.

c) Fire Watch

The men who had been carrying out the 'hot work' were instructed to check the area for fire before leaving, and they were to cease 'hot work' early enough to do this. The last man left the work area at the bottom of the loop belt casing at about five minutes after noon, and all the workmen stated that they had examined their work areas and below, before going up on deck to eat.

The SAFE WORKING PRACTICES REGULATIONS require:

"Fire Prevention and Protection

34. Whenever hot work is to be performed in a working area

(a) a qualified person shall be assigned to patrol the working area and adjoining areas and maintain therein a fire protection watch for the duration of the work and for a period of thirty minutes thereafter; and

(b) sufficient fire extinguishers shall be provided in the working area and adjoining areas."

No person was assigned to maintain a fire protection watch for a period of thirty minutes after 'hot work' was performed.

The status of a commercial vessel under repairs and without a crew makes it impractical to comply with some of the health and safety regulations intended for fully operational vessels with crews on board.

As some ship repair yards have their work practices governed by the Provincial Government, and in order to achieve uniformity in overlapping areas of responsibility, it has been agreed by the Canadian Coast Guard that where repairs or maintenance are conducted by employees of companies in general ship repair in Ontario, the Provincial Government shall be responsible for the health and safety standards aboard a vessel in that situation.

The Regulations for Construction Projects made under the Ontario Occupational Health and Safety Act require:

Section 98. "Where,

- (a) welding or cutting equipment; or
- (b) a blow torch or other similar equipment, is being used, suitable precautions shall be taken to prevent the outbreak of fire."

3. Discovery of Fire

The fire was discovered at about 1220. Heavy black smoke was seen coming from the spar deck door to the loop belt section of the self-unloading casing. Personnel eating in the accommodation close by were alerted to the fire, and a man went ashore to telephone the fire department.

The shipkeeper also telephoned the fire department from the vessel. One man went down to the engine-room to inform the men, and another entered No. 5 hatch and warned the men in the port side conveyor tunnel.

A leading hand taking his lunch in the port tunnel went aft and attacked the fire with a portable fire extinguisher located near by, but when he realized that the fire was too large to fight with extinguishers, he left the area.

The Port Colborne Fire Department received a call from an establishment situated downwind of the "ALGOSOO" at 1227. They were experiencing heavy smoke and they telephoned. The call from the "ALGOSOO" was recorded at 1228. The heavy smoke was also crossing the canal to the De Witt Carter School where preparations were made to evacuate the pupils.

4. Fire Fighting

a) Equipment

With the vessel under repair in winter conditions,

there was no water in the ship's fire main because it was drained when winterizing the ship.

There were no sprinkler fittings in the loop belt casing.

The Port Colborne Fire Department responded and had three vehicles on the scene at 1233.

Hoses were run up to the deck of the "ALGOSOO" and the fire was attacked through the entrance door to the loop belt casing in the port side alleyway on the spar deck. As the vessel was berthed in a rural area, with the nearest fire hydrant being about a quarter of a mile away, and because of the thick solid ice on the canal, two tanker trucks had to be called to supply water while a hole was cut in the ice to obtain hose suction.

The intense heat from the fire made the spar deck entrance approach ineffective. An aerial ladder with hose and remote control nozzle poured water through a doorway in the port side of the conveyor boom tower on the boat deck.

Additional help in fighting the fire was supplied by personnel, and/or equipment from the Niagara Regional Municipalities of Welland and Fort Erie No. 4 Ridgeway, the St. Lawrence Seaway Authority and Port Colborne Hydro.

b) Weather

The temperature was -7°C and the wind was westerly 15 - 20 knots. This gave a wind chill factor of -21°C and hampered fire-fighting operations. Ice on the catwalks of the conveyor boom over an open cargo hold made access treacherous.

c) Engine-Room

The owners requested some foam and it was brought to the scene at about 1530. It was applied to the engine-room through the ship's side door on the port side of the main deck. Whilst this door was being opened, there was a heavy explosion in the engine-room. The foam was effective in protecting the propulsion and auxiliary machinery.

d) Conveyor Tunnels

There was a discussion on the feasibility of fighting the fire through the conveyor tunnels, but when the dangers of (a) men being trapped and (b) friction losses from hoses, were considered, this was not attempted and efforts were concentrated on containing the fire from other access points.

e) Locked Doors

Thirty of the access, sleeping accommodation and store-room doors were locked for security purposes. While the locked doors initially prevented the flames from spreading into the rooms, the unavailability of the keys, which were kept in the spare room and thus engulfed by the flames, hampered the fire-fighters in their attempts to contain the fire and to extinguish fires started in these areas by heat conduction.

5. Spread of Fire in Accommodation

Open Doors

In general, it appears that neither welding cables nor oxy-acetylene hoses obstructed the doorways.

Oxygen and acetylene cylinders were positioned on the forward grating of the spar deck loop belt casing and the hoses were led down the casing.

Welding cables used for work in the starboard bunker were passed through the ventilator on the starboard side.

There was access to the conveyor tunnels through holes cut in the hopper sides of No. 5 hold.

The following doors were open:

spar deck (port)

1. main entrance
2. loop belt casing
3. washroom
4. foyer
5. crew's recreation room
- 5A. spare room
6. laundry room

spar deck (starboard)

7. staircase fire door

poop deck (port)

8. door at top of staircase
9. cooks' room
10. crew's messroom

poop deck (starboard)

11. galley entrance
12. store-room for self-unloading gear spares

These open doors allowed the fire to spread through the two decks.

6. Construction of Accommodation

The "ALGOSOO" complied with the requirements of Annex B of the Coast Guard Standard for the Implementation of Recommendations of the "CARTIERCLIFFE HALL" Formal Inquiry dated November 20, 1984 as a type "C" aft and "C1" forward.

As the forward accommodation was not affected by the fire, only the after portion will be considered.

Annex B states:

Type "C": Wheel-house forward, accommodation forward and aft, doors from individual cabins, messrooms, etc., providing access to interior corridors of non-combustible construction.

Enclosing of Stairways

Stairways which penetrate only a single deck shall be enclosed at least at one level by Class B-15 divisions and an approved self-closing Class A-O fire door. The construction of Class B-15 panels shall ensure that the enclosure is smoke-tight.

Stairways which penetrate more than a single deck shall be enclosed at each level by Class A-O divisions and approved self-closing Class A-O fire doors fitted at each level.

Fire doors in stairway enclosures if normally left open shall be held open by a magnetic hold-back capable of being released both at the door and from the wheel-house.

Stairways (treads, risers and stringers) shall be of steel construction. Where stairways are fully enclosed by Class A-O divisions at each level, and Class A-O fire doors fitted, existing stairs of wood construction will be accepted by the Coast Guard.

The vessel was found to comply with the requirements of Annex B mentioned above. The stairway on the spar deck, on the starboard side, was fitted with a Class A-O fire door and led to the poop deck above, whereas the stairway on the poop deck, on the port side, also fitted with a Class A-O fire door, led to the spar deck below. It is reported that these doors were open, allowing the fire to spread between the two decks.

7. Spread of Fire to Engine-Room

The temperature within the loop belt casing during the fire was over 600°C as indicated by the buckling of mild steel bulkheads and heavy I-Beams, and in places, the steel was seen to be red-hot.

There is conflicting evidence on the status of the spar deck port side entrance door to the engine-room; one of the last persons to pass through it indicated that it closed behind him. It was self closing. The door on the starboard side is believed to have been closed.

On the machinery deck (first deck above the tank top in the engine-room) forward of the main diesel engines, there are engineers' and electricians' store-rooms adjacent to the loop belt casing on the port and starboard sides, respectively.

The separating steel bulkhead has an A-O fire rating and the heat from the fire in the loop belt casing appears to have been conducted to the various combustibles in these stores causing fierce fires to burn before the foam was applied to the engine-room.

8. Explosion in Engine-Room

A heavy explosion that was heard in the area of the machinery deck of the engine-room is believed to have occurred in a hydraulic pipe on the port side of the machinery deck.

The forward section of this part of the engine-room contains the hydraulic power unit for the cargo hold hopper doors.

The supply pipe which burst above the compressor led from this unit to the port side of the forward engine-room bulkhead at frame 29 where all the hydraulic pipes had been cropped on the forward side of this bulkhead for renewal in the self-unloading machinery spaces.

In this area of the machinery deck, there was a fire which destroyed the electrical installations for the unloading motor control centre, the lighting-ventilation motor control centre, and the transformers situated near the ship's side plus the engine control room and its contents.

Of the two 45 gallon drums (204 L) found in this area, one which probably contained cleaning fluid, had expanded due to heat and remained intact, while the other, which contained hydraulic oil, had burst and probably contributed to the fire.

A Halon 1301 smothering gas system was being installed to protect the engine-room, but the gas cylinders had not been connected at the time of the fire.

9. Fire Alarm System

The "ALGOSOO"s fire alarm system was fitted to comply with the Fire Detection and Extinguishing Equipment Regulations with smoke detectors in all cabins, and heat sensors and pull fire alarms in the accommodation.

The system was designed to alert the Officer of the Watch in the wheel-house and, if not answered within two minutes, to set off the general alarm bells and release the magnetic holdbacks fitted on the fire doors in the accommodation.

The system was repaired on January 14 and 15, following which it was tested and found to be operating correctly.

When the fire broke out, the alarm bells did not ring and although the precise cause of the failure of the alarm system cannot be identified, it may be that the system was rendered inoperative prior to the fire.

After the fire, the general alarm battery charger in the wheel-house was found to be switched off and there may not have been enough power in the batteries to set off the alarm bells.

With the smoke and dust from welding, burning and sand blasting, the alarms would frequently go off; consequently, someone may have pulled a circuit breaker to de-activate the system.

The fire doors fitted with magnetic holdbacks that close when the alarm is given, may have been secured in the open position.

10. Laboratory Tests

The NRC Fire Research Laboratories in Ottawa tested random samples of the rubber conveyor belts involved, simulating as closely as possible the conditions of the casualty. It proved impossible to ignite the rubber with the burning slag produced by oxy-acetylene cutting. However, on spreading minimal amounts of hydraulic oil on the rubber samples, ignition was easily achieved. Copies of the test results are available on application.

11. Gas Free Certificates

The Safe Working Practices Regulations require that certificates of Gas Free Test be obtained for certain areas where 'hot work' was to be carried out.

The Ship Repairers had complied with these requirements and certificates for the diesel oil day tank and the diesel oil bunker tank had been issued.

12. Fires Reported in Self Unloader Conveyor Belt Systems

Since 1975, there have been four other reported fires in the conveyor belt systems of Canadian Great Lakes self unloaders.

Findings

An intense fire started in the loop belt area of the self-unloading gear of the "ALGOSOO", causing extensive damage. It would appear that the following factors contributed to the casualty:

- the fire was probably started by a spark or hot slag from burning and/or cutting operations near the loop belts or over the transfer conveyor belts;
- the conveyor belts were impregnated with oil which greatly contributed to ignition;
- there was no fire watch kept in the area of the 'hot work' for thirty minutes after the operations, contrary to prudent operation and the requirements of the Safe Working Practices Regulations;

- when discovered, the fire was already out of control;
- as the ship was in the hands of ship repairers and in winter conditions, there was neither a ship's crew nor a water supply available on board to fight the fire;
- the Port Colborne Fire Department responded immediately upon being called, but were hampered by the solid ice on the surface of the Welland Canal, by the difficulty of access to the loop belt casing and to the locked areas of the after house and by freezing weather conditions;
- it was impossible to seal off the area of the loop belt casing and make it airtight nor was there any permanently installed fire-fighting equipment inside the casing; and
- the fire spread through some open doors in the accommodation and, by heat conduction, it spread through bulkheads to the rest of the accommodation and to store-rooms in the engine-room.

Other Findings

The fitting of the Halon 1301 system that protects the engine-room had not been completed.

The application of foam to the engine-room through the ship's side door helped to minimize the damage to the main engines and most of the machinery.

The fire alarm system was not heard because it had probably been intentionally immobilized due to frequent false alarms, but this did not contribute to the outcome of the casualty.

OTTAWA, ONTARIO
NOVEMBER, 1986.

Glossary

Foam	a fire smothering medium
Hot Work	hot work includes welding and burning where flame is used or sparks are produced
i.d.	internal diameter
Loop Belts	a system of two conveyor loop belts which sandwich the cargo between them in order to lift it from the hold conveyors under the cargo holds to the boom conveyor above the deck
Sidelight	porthole
Spar Deck	weather deck on this vessel
Poop Deck	deck above the spar deck on this vessel
Transfer Conveyor Belts	transfer the cargo from the port and starboard hold conveyor belts to the loop belt system
UTC	Coordinated Universal Time

Annex I

Construction of Accommodation

After Accommodation - When originally built, the accommodation was constructed as follows:

Spar Deck aft

Corridor Bulkheads: 3/4" free standing solid wood, chipboard core with 1/16" plastic laminate each side.

Doors in Corridor Bulkheads: 1 1/4" solid wood chipboard core with 1/16" plastic laminate each side.

Toilet, Locker Room, Laundry & Engineer's Stores Boundaries: 1/4" steel bulkheads

Doors to Open Deck: Hollow metal draft doors and steel watertight doors.

Sidelights: One 18" hinged sidelight in every cabin, crew's recreation room, two 18" fixed and one 18" hinged sidelight.

Stairs: Inside accommodation - Wood
Outside accommodation - Steel.

In order to comply with the "CARTIERCLIFFE HALL" Inquiry Recommendations, the following alterations were made to the after accommodations:

Alterations to Spar Deck Aft

corridor bulkheads: existing chipboard bulkheads lined on corridor side in way of cabins and lockers with B-15 bulkheads;

doors to cabins, lockers, recreation room, laundry: steel clad on the inside;

corridor ceilings: existing ceilings removed and replaced with B-15 panels on steel grounds;

stairways: starboard up, 3/16" steel construction with 3/16" smoke tight enclosure;

fire doors: one A-O hollow metal door with heavy duty self-closing device in stairway enclosure.

Poop Deck accommodation as built.

Corridor Bulkheads, Cabin Divisions and Linings:

3/4" free standing solid wood chipboard core with 1/16" plastic laminate on each side.

Doors in Corridor Bulkheads:

1 1/4" solid wood chipboard core with 1/16" plastic laminate on each side.

Dry Stores Refrigerated Spaces Incinerator Room and Deck Store Boundaries:

1/4" steel bulkheads

Doors to Open Deck

hollow metal draft doors and steel weathertight doors.

Sidelights:

1 - 18" hinged steel sidelight in each cabin;
2 - 18" fixed and 1 - 18" hinged in galley;
2 - 18" fixed and 1 - 18" hinged in crew mess.

Ceilings

3/8" platewood - vinyl covered-on wood grounds.

Windows:

Officers' Mess 2" X 24" X 30" sliding;
and 1 - 24" X 30" fixed

Insulation

fibreglass

Stairs:

inside accommodation - wood;
outside accommodation - steel.

Alterations to Poop Deck Accommodation Made to Comply with Annex B.

Bulkheads:

Port side frame 20, smoke tight class A-O steel bulkhead in corridor fitted between house side and stairway enclosure.

Stairways:

Port side down, 3/16" smoke tight enclosure around stairway.

Fire Doors:

One A-O hollow metal door with heavy duty self-closing device bulkhead frame 20 plus magnetic holdback.

One A-O hollow metal door

Escapes:

Grab rails fitted outside and above the 18" diameter side-lights and windows for escape.

ANNEX II

PART X

FIRE PROTECTION FOR CARGO SHIPS OF 500 TONS GROSS TONNAGE OR MORE

Interpretation

204. In this Part,

"'A' Class division" means a division formed by a bulkhead or deck that is

- (a) constructed of steel or an equivalent material, and
- (b) stiffened so as to be capable of presenting the passage of smoke and flame when subjected to the standard fire test for a period of 60 minutes;

(cloisonnement de type A)

"'A-60' Class division", "'A-30' Class division" and "'A-15' Class division" means an 'A' Class division that is insulated with approved non-combustible materials so that if either face of the division is subjected to the standard fire test the average temperature on the other face of the division will not rise more than 139°C above the original temperature and the temperature at any point, including any joint, will not rise more than 180°C above the original temperature during

- (a) the first 60 minutes of that test, in the case of an 'A-60' Class Division,
- (b) the first 30 minutes of that test, in the case of and 'A-30' Class division, and
- (c) the first 15 minutes of that test, in the case of an 'A-15' Class division;

(cloisonnement de type A-60), (cloisonnement de type A-30) and (cloisonnement de type A-15)

"'A-0' Class division" means an 'A' Class division that does not meet the insulation requirements specified in the definition "'A-60' Class division", "'A-30' Class division" and "'A-15' Class division"; (cloisonnement de type A-0)

"'A-60' Class fire rating", "'A-30' Class fire rating", "'A-15' Class fire rating" and "'A-0' Class fire rating" means the thermal and integrity requirements specified in the definition "'A-60' Class division", "'A-30' Class division" and "'A-15' Class division" and in the definition "'A-0' Class division", as the case may be; (indice de résistance au feu de type A-60), (indice de résistance au feu de type A-30), (indice de résistance au feu de type A-15) and (indice de résistance au feu de type A-0)

"accommodation space" includes any public space, corridor, lavatory, cabin, office, crew quarters, hospital, cinema, game or hobby room, pantry, other than a pantry that contains cooking appliances, and any other similar space; (local d'habitation)

"'B' Class division" means a division formed by a bulkhead, ceiling or lining that is constructed so as to be capable of preventing the passage of flame when subjected to the standard fire test for 30 minutes; (cloisonnement de type B)

"'B-15' Class division" means a 'B' Class division that is constructed of approved non-combustible materials so that if either face of the division is subjected to the standard fire test the average temperature of the other face of the division will not rise more than 139°C above the original temperature and the temperatures at any point, including any joint, will not rise more than 225°C above the original temperature during the first 15 minutes of that test; (cloisonnement de type B-15)

APPENDICE II

PARTIE X

PROTECTION CONTRE L'INCENDIE DES NAVIRES DE CHARGE D'UNE JAUGE BRUTE DE 500 TONNEAUX OU PLUS

Définitions

204. Dans la présente partie,

«cloisonnement de type A» désigne un cloisonnement formé par une cloison ou un pont

- a) construits en acier ou en un matériau équivalent, et
- b) renforcés de manière à pouvoir empêcher le passage de la fumée et des flammes quand ils sont soumis pendant 60 minutes à l'essai au feu standard; ('A' Class division)

«cloisonnement de type A-60», «cloisonnement de type A-30» et «cloisonnement de type A-15» désignent un cloisonnement du type A isolé au moyen de matériaux non combustibles approuvés, de sorte que si l'une ou l'autre des faces du cloisonnement est soumise à l'essai au feu standard, la température moyenne de la surface non exposée du cloisonnement ne puisse dépasser de plus de 139 °C la température initiale et que la température en un point quelconque, joints compris, ne puisse dépasser de plus de 180 °C la température initiale pendant

- a) les 60 premières minutes de l'épreuve, dans le cas d'un cloisonnement de type A-60,
- b) les 30 premières minutes de l'épreuve, dans le cas d'un cloisonnement de type A-30, et
- c) les 15 premières minutes de l'épreuve, dans le cas d'un cloisonnement de type A-15;

('A-60' Class division), ('A-30' Class division) et ('A-15' Class division)

«cloisonnement de type A-0» désigne un cloisonnement de type A qui n'est pas isolé de la façon prescrite dans la définition de «cloisonnement de type A-60», «cloisonnement de type A-30» et «cloisonnement de type A-15»; ('A-0' Class division)

«indice de résistance au feu de type A-60», «indice de résistance au feu de type A-30», «indice de résistance au feu de type A-15» et «indice de résistance au feu de type A-0» désignent les prescriptions de température et de résistance contenues dans les définitions de «cloisonnement de type A-60», «cloisonnement de type A-30» et «cloisonnement de type A-15» et de «cloisonnement de type A-0», selon le cas: ('A-60' Class fire rating), ('A-30' Class fire rating), ('A-15' Class fire rating) et ('A-0' Class fire rating)

«local d'habitation» comprend les locaux de réunion, les coursives, les locaux sanitaires, les cabines, les bureaux, les locaux affectés à l'équipage, l'hôpital, le cinéma, les salles de jeux et de loisir, les offices ne contenant pas d'appareils de cuisson et les autres locaux semblables; (accommodation space)

«cloisonnement de type B-15» désigne un cloisonnement de type B construit de matériaux non combustibles approuvés, de sorte que si l'une ou l'autre des faces du cloisonnement est soumise à l'essai au feu standard, la température moyenne de la surface non exposée ne puisse dépasser de plus de 139°C la température initiale et que la température en un point quelconque, joints compris, ne puisse dépasser de plus de 225°C la température initiale pendant les 15 premières minutes de l'essai: ('B-15' Class division)

"'B-0' Class division" means a 'B' Class division that does not meet the insulation requirements specified in the definition "'B-15' Class division"; (*cloisonnement de type B-0*)

"'B-15' Class fire rating" and "'B-0' Class fire rating" means the thermal and integrity requirements specified in the definition "'B-15' Class division" or "'B-0' Class division", as the case may be; (*indice de résistance au feu de type B-15*) and (*indice de résistance au feu de type B-0*)

"Board" means the Board of Steamship Inspection; (*Bureau*)

"cargo space" means a space used to contain cargo and includes cargo oil tanks and trunks to a cargo space; (*espace à cargaison*)

"continuous 'B' Class ceiling" or "continuous 'B' Class lining" means a ceiling or lining that is constructed to the standard required for a 'B' Class division and that terminates only at an 'A' Class division or 'B' Class division; (*vaigrage continu de type B*) or (*lambrissage continu de type B*)

"control station" includes

(a) every space containing emergency sources of power and lighting.

"cloisonnement de type B-0" désigne un cloisonnement de type B qui n'est pas isolé de la façon prescrite dans la définition de «cloisonnement de type B-15»; (*'B-0' Class division*)

"indice de résistance au feu de type B-15" et "indice de résistance au feu de type B-0" désignent les exigences de température et de résistance contenues dans la définition de «cloisonnement de type B-15» et de «cloisonnement de type B-0», selon le cas; (*'B-15' Class fire rating*) et (*'B-0' Class fire rating*)

"Bureau" désigne le Bureau d'inspection des navires à vapeur; (*Board*)

"espace à cargaison" désigne un espace utilisé pour les marchandises et comprend les citernes destinées aux hydrocarbures, ainsi que les puits qui y aboutissent; (*cargo space*)

"vaigrage continu de type B" ou "lambrissage continu de type B" désignent un vaigrage ou un lambrissage construits selon les normes prescrites pour un cloisonnement de type B et qui ne se terminent qu'à un cloisonnement de type A ou à un cloisonnement de type B. (*continuous 'B' Class ceiling*) ou (*continuous 'B' Class lining*)

"poste de sécurité" comprend

a) tout local contenant les sources d'alimentation électrique et d'éclairage de secours.

FIG. 1 AREAS WHERE "HOT WORK" WAS BEING
CARRIED OUT PRIOR TO THE FIRE

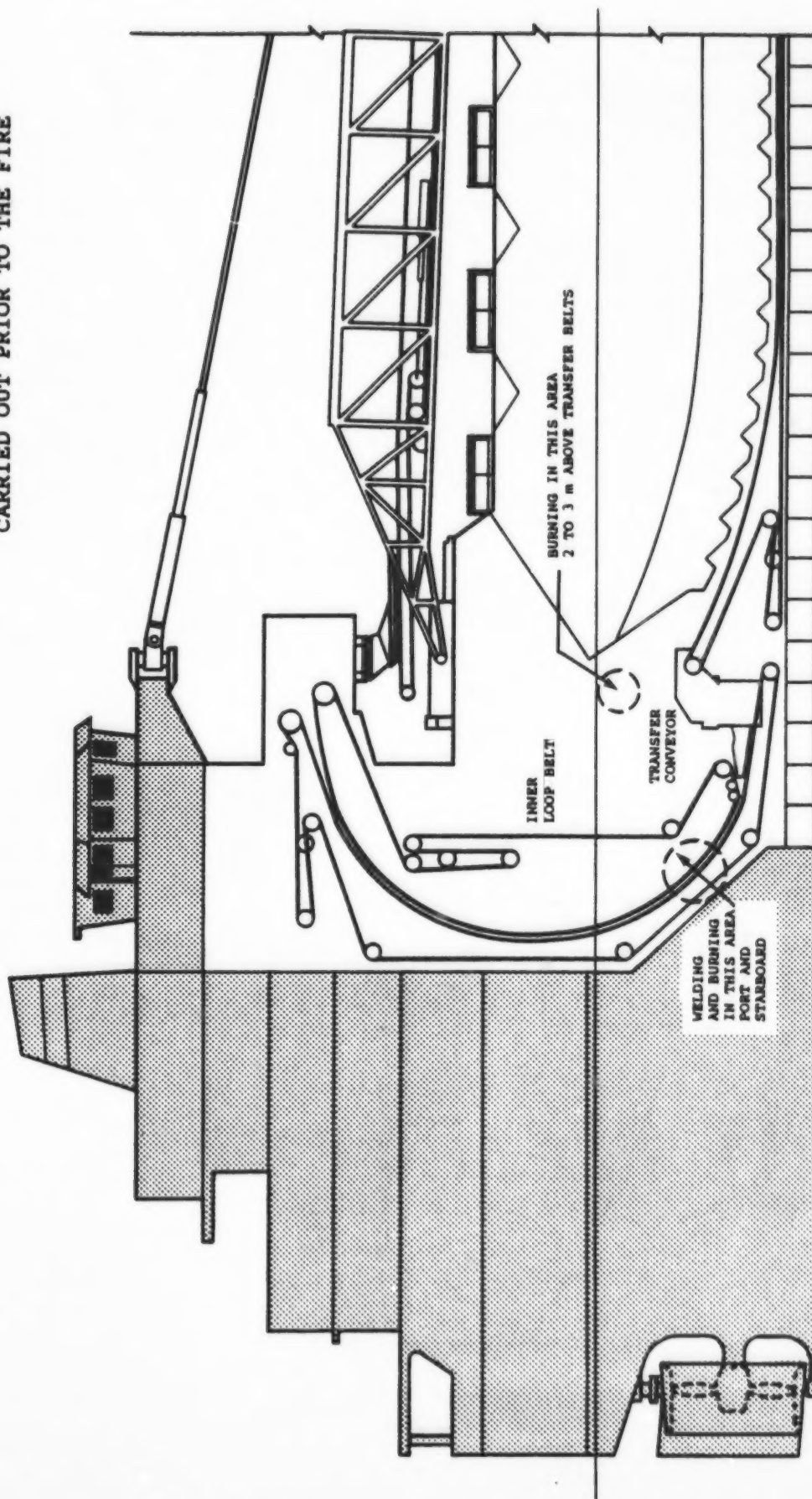


FIG. 2 SPAR DECK

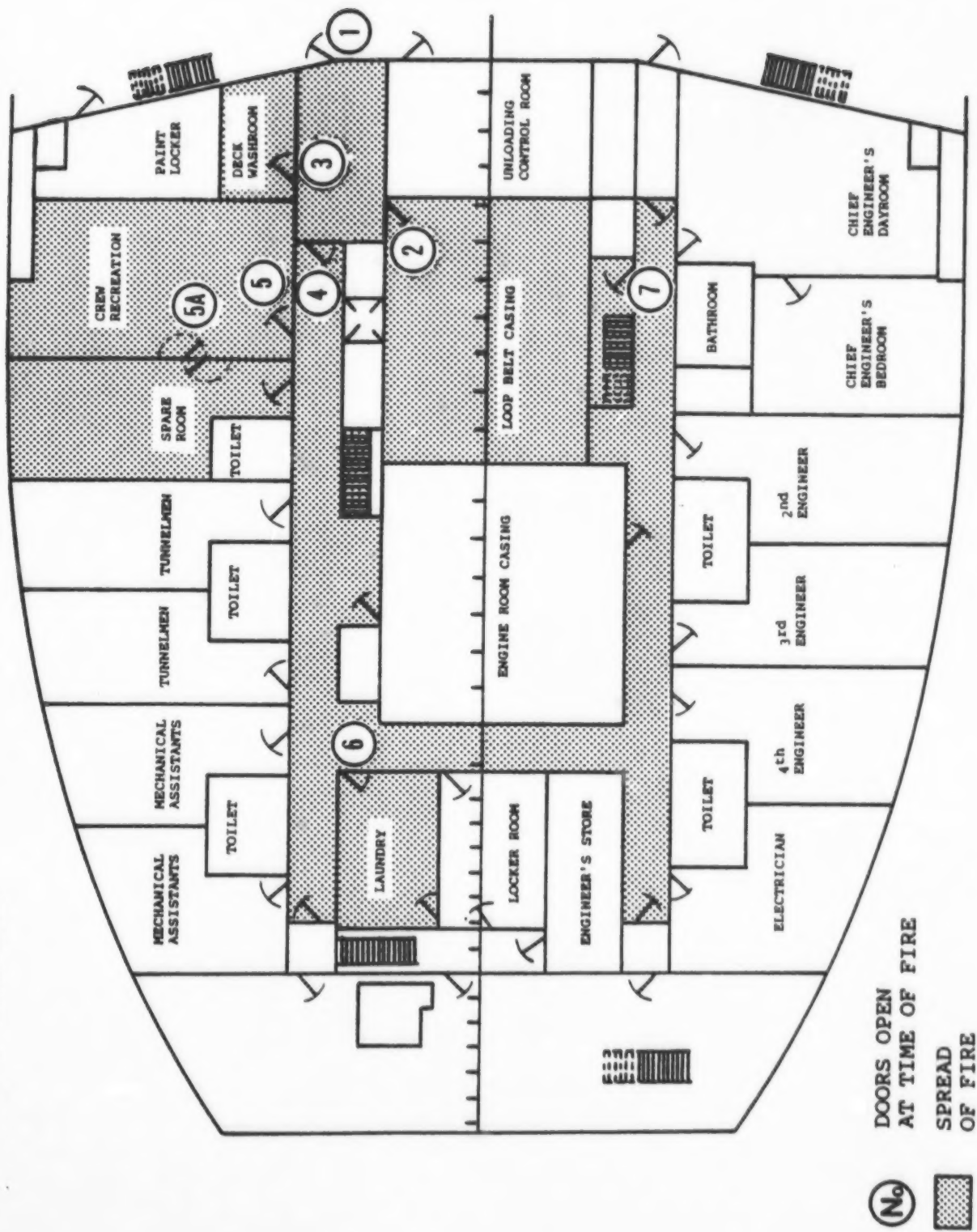
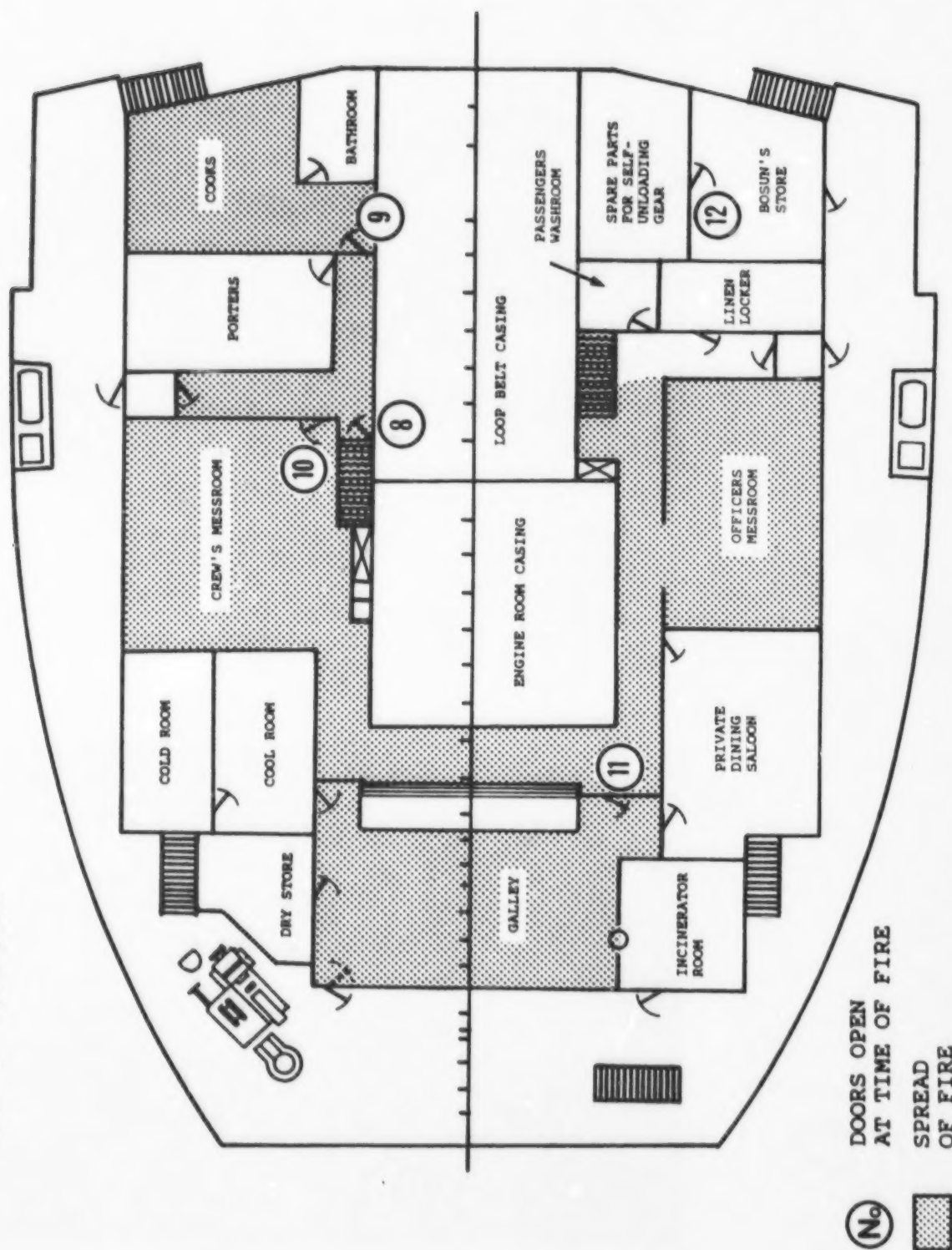
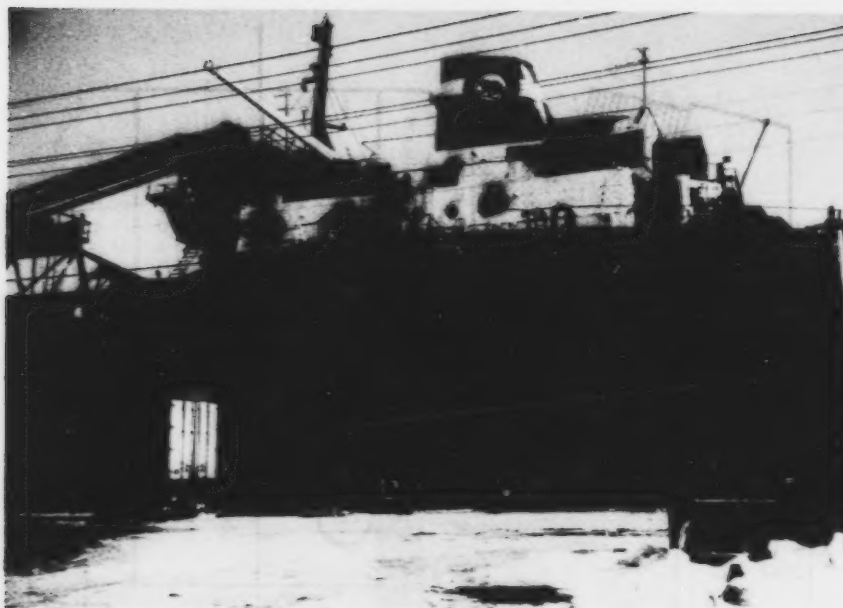


FIG. 3 POOP DECK





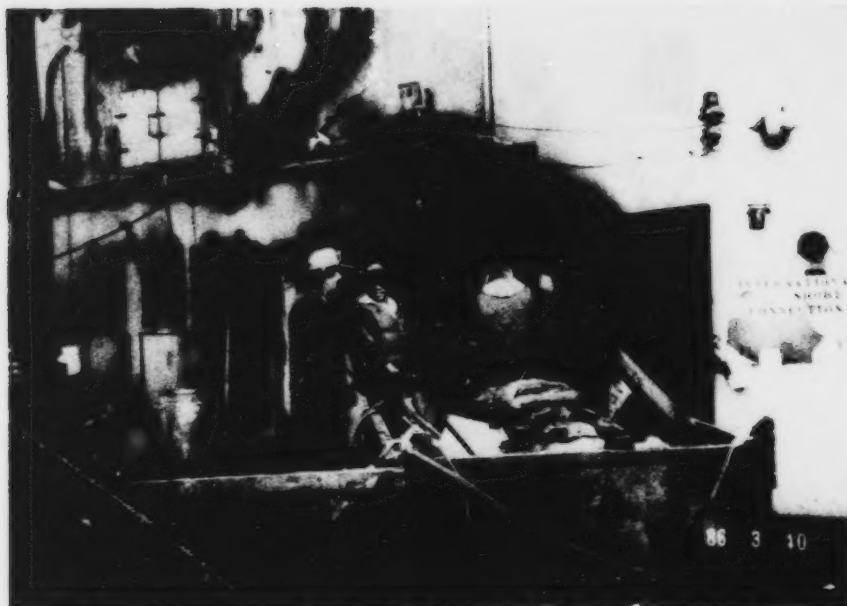
1. "ALGOSOO" PORT SIDE. SHOWING BURN MARKS
AND SIDE DOOR THROUGH WHICH FOAM
WAS APPLIED.

CÔTÉ BÂBORD DU "ALGOSOO". MARQUES DE BRÛLURE
ET SABORD PAR LEQUEL LA MOUSSE FUT INJECTÉE



2. CLOSE-UP VIEW OF THE PORT SIDE

CÔTÉ BÂBORD VU DE PRÈS



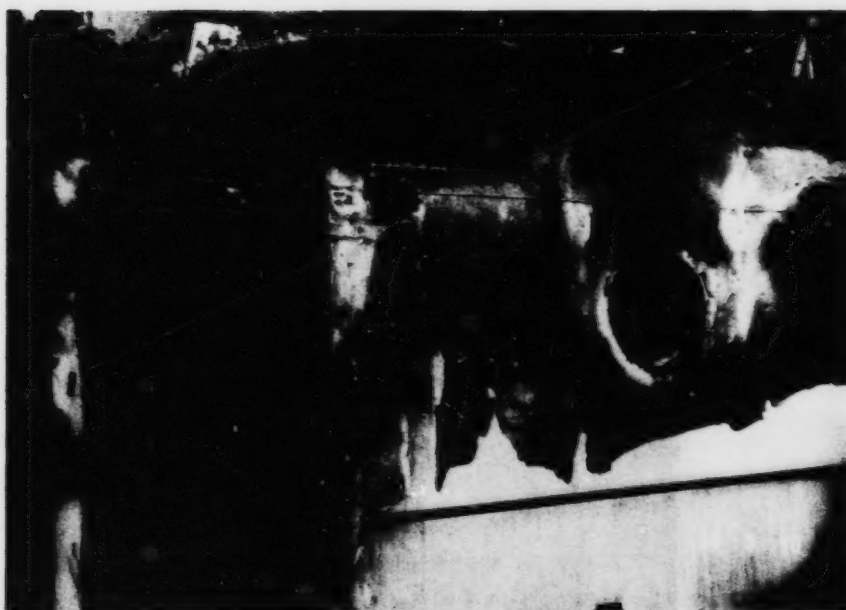
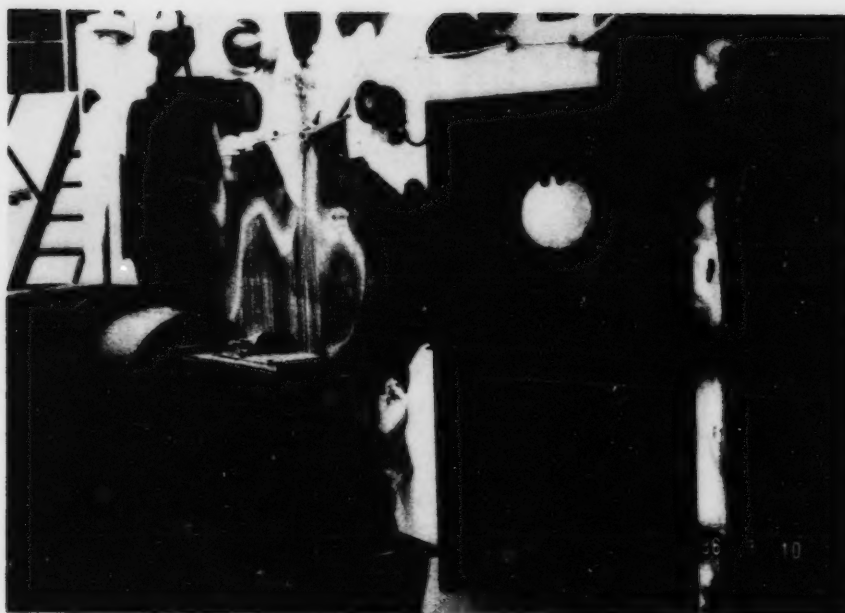
3. SPAR DECK ENTRANCE DOOR

PORTE D'ENTRÉE DU SPARDECK



4. OXY-ACETYLENE BOTTLES WERE KEPT
ON THIS UPPER GRATING, SITUATED
FORWARD IN THE LOOP-BELT CASING

LES BOUTEILLES OXYACÉTYLÉNIQUES
ÉTAIENT GARDÉES SUR CE CAILLEBOTIS
SUPÉRIEUR À L'AVANT DANS L'ENCAISSEMENT
DU CONVOYEUR MONTE-CHARGE



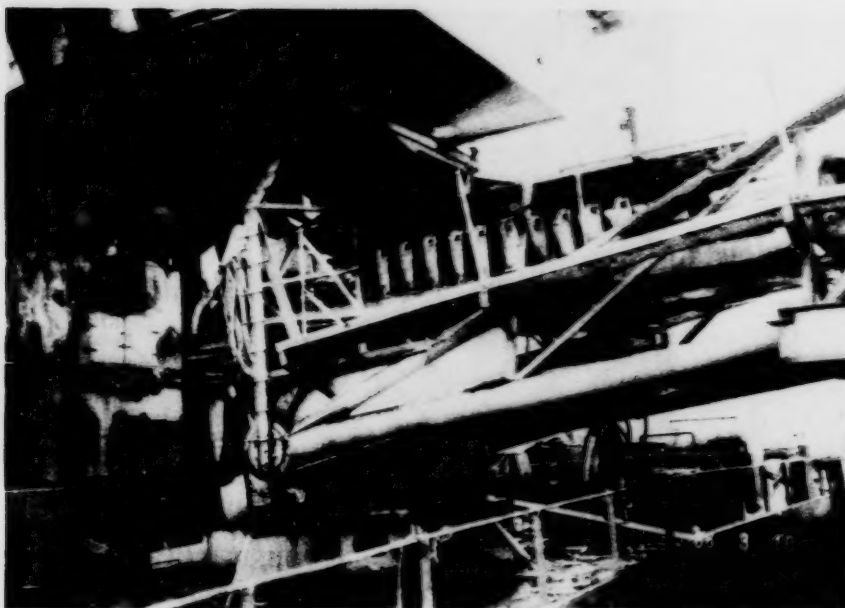
5,6. POOP. AFTER BULKHEAD AT GALLEY

DUNETTE. CLOISON ARRIÈRE DE LA CUISINE



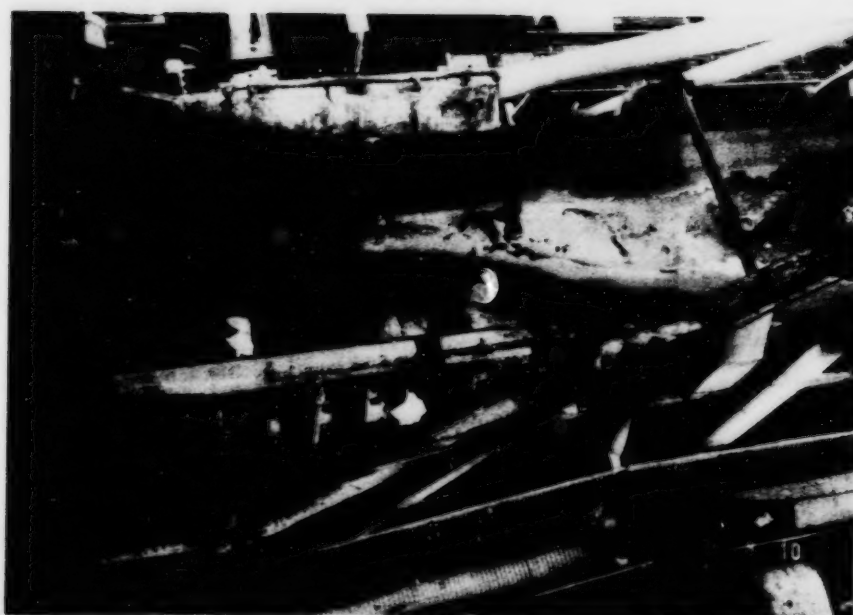
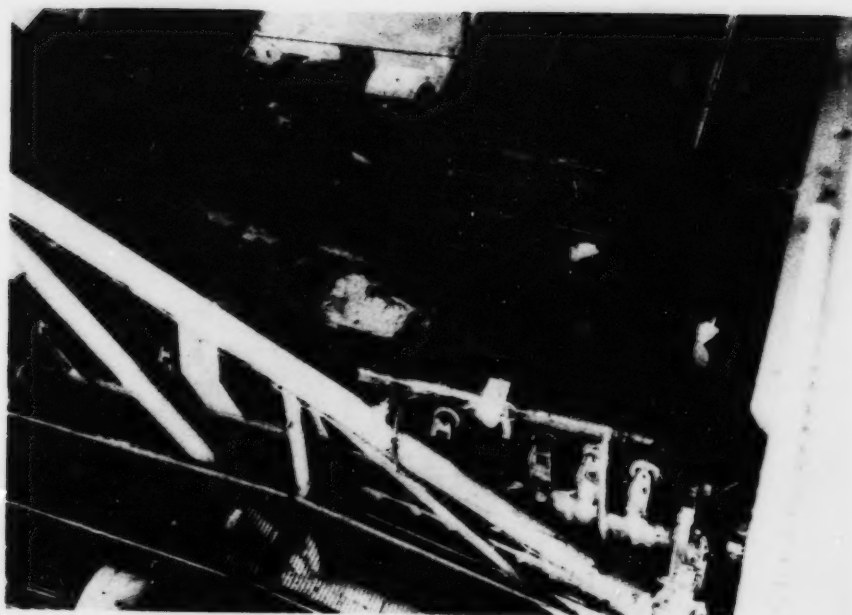
7. BOOM CONVEYOR
AND TOWER

RAMPE AUTO
DÉCHARGEUSE
ET TOUR



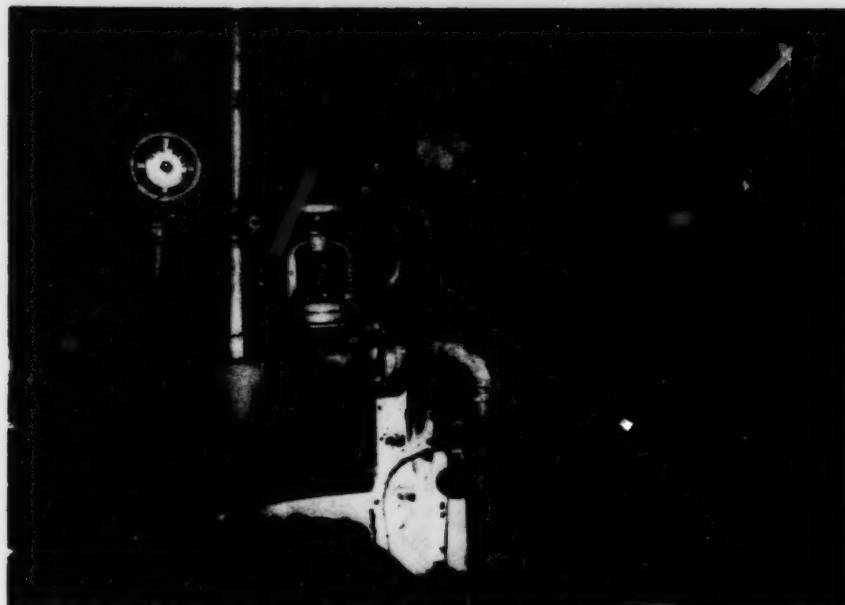
8. SCORCHING AND FIRE DAMAGE

BRÛLURE ET AVARIES PAR LE FEU



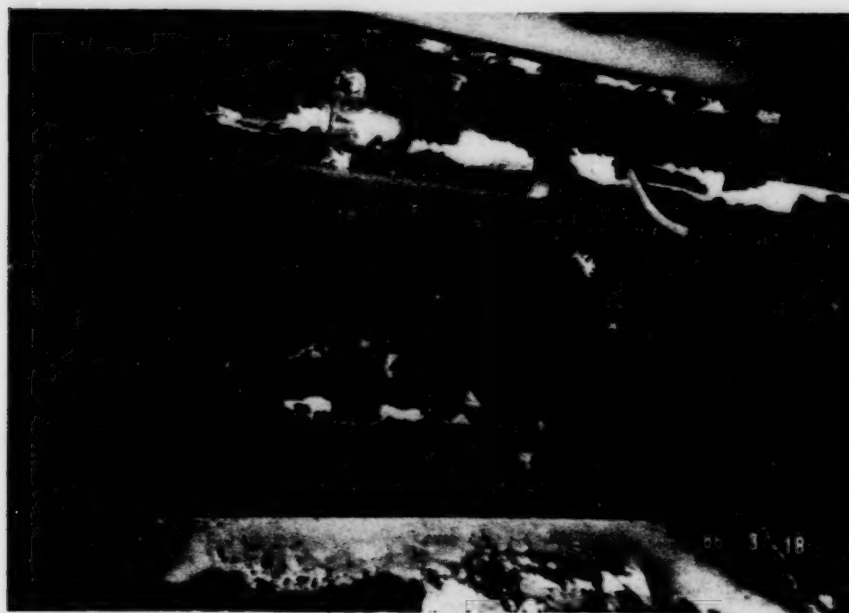
9,10. DAMAGE TO BOOM CONVEYOR BELT

AVARIES À LA COURROIE TRANSPORTEUSE
DE LA RAMPE AUTO DÉCHARGEUSE



11. FIRE DAMAGE ON MACHINERY DECK IN
ENGINE-ROOM

AVARIES PAR LE FEU SUR LE PONT
DES MACHINES DANS LA SALLE DES MACHINES



12. BURST HYDRAULIC PIPE. ENGINE ROOM, PORT SIDE

TUYAU HYDRAULIQUE FENDU. SALLE DES MACHINES,
BÂBORD



13. DAMAGE TO ELECTRICIAN'S STORES
AVARIES AU MAGASIN DE L'ÉLECTRICIEN



14. DAMAGE TO ELECTRICIAN'S STORES
AVARIES AU MAGASIN DE L'ÉLECTRICIEN